Response to Surface Water Crossing Request for Additional Information

PREPARED FOR: Wisconsin DNR

PREPARED BY: CH2M HILL

DATE: January 14, 2015

This memorandum provides the response to the Wisconsin DNR information request, provided on November 3, 2014, about pipelines crossing surface waters.

Request for Additional Information: Description of the "other surface waters" including intermittent streams and unnamed ditches and canals that are likely to be impacted by each supply and return alternative. This includes how they will be crossed (generally) and specific methods that will be used to minimize impacts.

Response: Other surface waters impacted by each supply and return flow alternative are included in the attached table (Updated Table 6-13). The information in the table is consistent with what was provided via email on July 18, 2014. These surface waters are those affected by water supply or return flow pipeline construction. The attached table lists surface water crossing information by alternative. Where no crossing width is included, the pipeline construction either infringes upon the adjacent surface water, based on aerial confirmation of the GIS data, or there was no surface water width information available in GIS format.

Impacts during pipeline construction on in-stream and shoreline vegetative cover may include permanent alteration if woody vegetation must be removed from the pipeline right-of-way or temporary loss at pipeline water crossings within herbaceous emergent wetlands. Submergent and emergent vegetation, in-stream logs and rocks, and undercut banks provide cover for fish and other aquatic biota. Fish and other aquatic life that live in these areas may be displaced during construction. Stream banks will be restored after construction to promote regrowth of riparian vegetation and restoration of habitat features impacted during construction.

Impacts to soils and plant communities of vegetated wetlands that may border water crossings will be minimized and mitigated using environmental construction best management practices (BMPs) such as the use of erosion and sedimentation controls, placement of swamp mats as a working surface for heavy equipment, and the segregation of topsoil containing the wetland seed bank from the subsoils during trench excavation, so that the original soil profile is restored when backfilling the trench. Site hydrology will be preserved by restoring the original contours and elevations within the wetland and removing a volume of trench spoil (sub-soils lacking seed) equal to the volume of pipelines placed within the wetland, so that there is no net placement of fill or loss of flood storage capacity from the wetland and waterbody.

During pipeline design, the City of Waukesha will work with the resource agencies to determine the appropriate construction techniques for each crossing to minimize and mitigate construction impacts. Regulatory permits will be required for each surface water and wetland crossing and the design will be developed to meet the permit regulatory requirements. Common construction techniques that could be used to minimize construction impacts are discussed in the Environmental Report, Appendix 5-2, Example Wetland and Waterway Pipeline Construction Crossing Impact Minimization Techniques.

In general, construction techniques that range from open cut to horizontal directional drilling could be used for surface water crossings based upon the surface water crossing width, crossing environmental conditions, and site specific geotechnical, construction, and other constraints. Typical construction techniques could be based upon surface water crossing width at the ordinary high water mark.

Optimal crossing methods will be discussed with WDNR to avoid, minimize, and mitigate impacts to all wetlands. Special construction methods also may be needed for crossings of wetlands and waters inhabited by rare, threatened, or endangered (RTE) species of flora or fauna, such as rescue and relocation or replanting of RTE plants or relatively immobile fauna (e.g., turtles). In situations where impacts to aquatic or wetland habitat of RTE species are a major concern, it is expected that WDNR may require seasonal restrictions on construction activity and/or the use of horizontal directional drilling (HDD) methods, to entirely avoid disturbance or permanent alteration of these RTE species and their habitats.

TABLE 6-13

Water Body Crossings

Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
	Original Information Provided in Table 6-13 of the ER						Additional Information		
Supply									
Deep and Shallow Aquifers	3	Fox River	Perennial	139.4	0.24	WWSF	-88.286643	42.946285	742500
Deep and Shallow Aquifers	2855	Unnamed	Intermittent /ephemeral	17.4	0.03	—	-88.279493	42.941467	5037071
Deep and Shallow Aquifers	2931	Pebble Brook	Perennial	46.5	0.08	Unknown	-88.254112	42.93607	769500
Deep and Shallow Aquifers	2973	Unnamed	Intermittent /ephemeral	11.6	0.02	—	-88.25727	42.97856	771200
Shallow Aquifer and Fox River Alluvium	3	Fox River	Perennial	342.7	0.59	WWSF	-88.286643	42.946285	742500
Shallow Aquifer and Fox River Alluvium	2855	Unnamed	Intermittent /ephemeral	17.4	0.03	—	-88.279493	42.941467	5037071
Shallow Aquifer and Fox River Alluvium	2931	Pebble Brook	Perennial	46.5	0.08	Unknown	-88.286643	42.946285	769500
Shallow Aquifer and Fox River Alluvium	2973	Unnamed	Intermittent /ephemeral	11.6	0.02	—	-88.25727	42.97856	771200
Lake Michigan (City of Milwaukee)	1845	Poplar Creek	Perennial	16.8	0.03	Unknown	-88.177658	43.009923	772800
Lake Michigan (City of Milwaukee)	3294	Unnamed	Intermittent /ephemeral	—	0.002	—	-88.145419	43.010124	773100
Lake Michigan (City of Milwaukee)	3305	Unnamed	Intermittent /ephemeral	—	0.005	—	-88.16275	43.010092	773100
Lake Michigan (City of Milwaukee)	3315	Deer Creek	Perennial	—	0.02	WWSF	-88.114462	43.010217	772900
Lake Michigan (City of Milwaukee)	4310	Honey Creek	Perennial	—	0.002	—	-87.9937	42.97394	16300
Lake Michigan (City of Milwaukee)	22799	North Branch Root River	Perennial	—	0.17	WWSF	-88.057428	42.989461	2900
Lake Michigan (City of Milwaukee)	22800	North Branch Root River	Perennial	19.8	0.04	WWSF	-88.050328	42.973514	2900

TABLE 6-13

Water Body Crossings

Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
	Original Information Provided in Table 6-13 of the ER						Additional Information		
Supply									
Lake Michigan (City of Oak Creek) Alignment 1	1845	Poplar Creek	Perennial	16.8	0.03	Unknown	-88.177658	43.009923	772800
Lake Michigan (City of Oak Creek) Alignment 1	3294	Unnamed	Intermittent /ephemeral	1.7	0.003	—	-88.145419	43.010124	773100
Lake Michigan (City of Oak Creek) Alignment 1	3305	Unnamed	Intermittent /ephemeral	2.9	0.005	—	-88.16275	43.010092	773100
Lake Michigan (City of Oak Creek) Alignment 1	3315	Deer Creek	Perennial	11.6	0.02	WWSF	-88.114462	43.010217	772900
Lake Michigan (City of Oak Creek) Alignment 1	4887	North Branch Root River	Perennial	18.9	0.04	WWSF	-88.045685	42.970443	2900
Lake Michigan (City of Oak Creek) Alignment 1	5103	Unnamed	Perennial	36.4	0.02	—	-88.028614	42.929703	6200
Lake Michigan (City of Oak Creek) Alignment 1	5637	Oak Creek	Perennial	22.3	0.01	—	-87.885663	42.886327	14500
Lake Michigan (City of Oak Creek) Alignment 1	6272	North Branch Root River	Perennial	19.8	0.04	WWSF	-88.026299	42.951377	2900
Lake Michigan (City of Oak Creek) Alignment 1	6663	Unnamed	Perennial	46	0.027	—	-88.028635	42.931133	6300
Lake Michigan (City of Oak Creek) Alignment 1	22799	North Branch Root River	Perennial	—	0.17	WWSF	-88.057428	42.989461	2900
Lake Michigan (City of Oak Creek) Alignment 2	3732	Unnamed	Intermittent /ephemeral	14.3	0.02	Unknown	-88.091968	42.919322	6200
Lake Michigan (City of Oak Creek) Alignment 2	3932	North Branch Root River	Perennial	49.7	0.09	WWSF	-87.99132	42.886752	2900
Lake Michigan (City of Oak Creek) Alignment 2	5109	Unnamed	Intermittent /ephemeral	18.9	0.04	Unknown	-88.064881	42.910056	6200
Lake Michigan (City of Racine)	1845	Poplar Creek	Perennial		0.03	Unknown	-88.177658	43.009923	772800
Lake Michigan (City of Racine)	3280	Poplar Creek	Perennial	—	1.09	Unknown	-88.171949	43.007784	772800

TABLE 6-13

Water Body Crossings

Original Information Provided in Table 6-13 of the ER							Additional Information		
Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
Supply									
Lake Michigan (City of Racine)	3333	Unnamed	Intermittent /ephemeral	—	0.07	—	-88.119448	42.846626	N/A
Lake Michigan (City of Racine)	3335	Unnamed	Intermittent /ephemeral	—	0.05	—	-88.11644	42.846642	N/A
Lake Michigan (City of Racine)	3408	Unnamed	Intermittent /ephemeral	—	0.02	—	-88.139462	42.857597	762200
Lake Michigan (City of Racine)	3413	Unnamed	Intermittent /ephemeral	—	0.08	—	-88.139693	42.859693	762200
Lake Michigan (City of Racine)	3432	Muskego Drainage Canal	Perennial	—	0.51	Unknown	-88.13901	42.859526	762200
Lake Michigan (City of Racine)	3459	Unnamed	Intermittent /ephemeral	—	0.2	—	-88.139671	42.868658	N/A
Lake Michigan (City of Racine)	3484	Unnamed	Intermittent /ephemeral	—	0.02	—	-88.141351	42.872372	5037694
Lake Michigan (City of Racine)	3486	Unnamed	Intermittent /ephemeral	—	0.06	—	-88.157095	42.87249	5577130
Lake Michigan (City of Racine)	8339	Unnamed	Intermittent /ephemeral	—	0.24	—	-87.891693	42.824924	N/A
Lake Michigan (City of Racine)	210	Husher Creek	Perennial	2.5	0.01	—	-87.911284	42.825209	3500
Lake Michigan (City of Racine)	668	Hoods Creek	Perennial	11.5	0.02	—	-87.878047	42.751673	3100
Lake Michigan (City of Racine)	1827	Goose Lake Branch Canal	Perennial	3.9	2.23[b]	—	-88.104467	42.832876	5038430
Lake Michigan (City of Racine)	2282	Root River Canal	Perennial	35.4	0.07	—	-87.998692	42.826378	4300

TABLE 6-13

Water Body Crossings

Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
	Original Information Provided in Table 6-13 of the ER						Additional Information		
Supply									
Lake Michigan (City of Racine)	20172	Mill Creek	Perennial	4.2	0.01	—	-88.18821	42.950652	769700
Return									
Underwood Creek to Lake Michigan	1738	Unnamed	Intermittent /ephemeral	—	0.002	—	-88.067884	43.035451	16800
Underwood Creek to Lake Michigan	1845	Poplar Creek	Perennial	—	0.03	Unknown	-88.177658	43.009923	772800
Underwood Creek to Lake Michigan	3052	Unnamed	Intermittent /ephemeral	—	0.01	—	-88.206548	43.009639	771650
Underwood Creek to Lake Michigan	3054	Unnamed	Intermittent /ephemeral	—	0.08	—	-88.198033	43.009977	N/A
Underwood Creek to Lake Michigan	3055	Unnamed	Intermittent /ephemeral	—	0.001	—	-88.195925	43.009941	N/A
Underwood Creek to Lake Michigan	3294	Unnamed	Intermittent /ephemeral	—	0.003	—	-88.145419	43.010124	773100
Underwood Creek to Lake Michigan	3305	Unnamed	Intermittent /ephemeral	—	0.005	—	-88.16275	43.010092	773100
Underwood Creek to Lake Michigan	3315	Deer Creek	Perennial	—	0.02	WWSF	-88.114462	43.010217	772900
Root River to Lake Michigan Alignment 1	1845	Poplar Creek	Perennial	—	0.03	Unknown	-88.177658	43.009923	772800
Root River to Lake Michigan Alignment 1	3052	Unnamed	Intermittent /ephemeral	—	0.01	—	-88.206548	43.009639	771650
Root River to Lake Michigan Alignment 1	3054	Unnamed	Intermittent /ephemeral	—	0.08	—	-88.198033	43.009977	N/A
Root River to Lake Michigan Alignment 1	3055	Unnamed	Intermittent /ephemeral	—	0.001	—	-88.195925	43.009941	N/A

TABLE 6-13

Water Body Crossings

Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
	Original Information Provided in Table 6-13 of the ER						Additional Information		
Supply									
Root River to Lake Michigan Alignment 1	3294	Unnamed	Intermittent /ephemeral	—	0.003	—	-88.145419	43.010124	773100
Root River to Lake Michigan Alignment 1	3305	Unnamed	Intermittent /ephemeral	—	0.005	—	-88.162750	43.010092	5575698
Root River to Lake Michigan Alignment 1	3315	Deer Creek	Perennial	—	0.02	WWSF	-88.114462	43.010217	772900
Root River to Lake Michigan Alignment 1	4887	North Branch Root River	Perennial	10.6	0.03	WWSF	-88.045685	42.970443	2900
Root River to Lake Michigan Alignment 1	5985	North Branch Root River	Perennial	—	0.006	WWSF	-88.014088	42.945158	2900
Root River to Lake Michigan Alignment 1	7437	North Branch Root River	Intermittent	—	0.03	WWSF	-88.067529	43.0009	2900
Root River to Lake Michigan Alignment 1	22799	North Branch Root River	Perennial	—	0.21	WWSF	-88.057428	42.989461	2900
Root River to Lake Michigan Alignment 2	3732	Unnamed	Intermittent /ephemeral	14.3	0.02	—	-88.091928	42.919422	6200
Root River to Lake Michigan Alignment 2	4264	North Branch Root River	Perennial	38.7	0.07	WWSF	-87.994821	42.87266	2900
Root River to Lake Michigan Alignment 2	4325	North Branch Root River	Perennial	6.6	0.17	WWSF	-87.990174	42.855677	2900
Root River to Lake Michigan Alignment 2	5109	Unnamed	Intermittent /ephemeral	18.9	0.04	—	-88.064881	42.910056	6200
Direct to Lake Michigan	1845	Poplar Creek	Perennial	—	0.03	Unknown	-88.177658	43.009923	772800
Direct to Lake Michigan	3052	Unnamed	Intermittent /ephemeral	—	0.01	—	-88.206548	43.009639	771650

TABLE 6-13

Water Body Crossings

Alternative	Water Body/ Stream No.	Water Body Name	Water Body Type	Approximate Crossing Width (ft)	Crossing Area (acres)	Fisheries Classification[a]	Latitude	Longitude	WBIC[c]
	Original Information Provided in Table 6-13 of the ER						Additional Information		
Supply									
Direct to Lake Michigan	3054	Unnamed	Intermittent /ephemeral	—	0.08	—	-88.198033	43.009977	N/A
Direct to Lake Michigan	3055	Unnamed	Intermittent /ephemeral	—	0.001	—	-88.195925	43.009941	N/A
Direct to Lake Michigan	3294	Unnamed	Intermittent /ephemeral	—	0.003	—	-88.145419	43.010124	773100
Direct to Lake Michigan	3305	Unnamed	Intermittent /ephemeral	—	0.005	—	-88.16275	43.010092	773100
Direct to Lake Michigan	3315	Deer Creek	Perennial	—	0.02	WWSF	-88.114462	43.010217	772900
Direct to Lake Michigan	5428	Lake Michigan	Lake	—	6.24	—	-87.840952	42.966368	20
Direct to Lake Michigan	6566	Kinnickinnic River	Perennial	74.5	0.07	—	-87.934516	42.993764	15100

[a] WDNR (2010d).

[b] The current theoretical project alignment for Lake Michigan–Racine Supply is parallel to the Goose Lake Branch Canal, but the actual construction corridor would be narrowed to avoid impacts to the water body.

[c] Water Body Identification Code (WBIC) from the WDNR Surface Water Data Viewer, Intermittent Streams and Water body Details layers. Water body crossings assigned a WBIC of N/A refers to water bodies not found in the WDNR Surface Water Data Viewer.

Appendix 5-2

Example Wetland and Waterbody Pipeline Construction and Mitigation Procedures

APPENDIX 5-2

Example Wetland and Waterbody Pipeline Construction and Mitigation Procedures

This appendix outlines common practices that can be used to minimize the impact of constructing long pipelines through waterways or wetlands. The process of providing Lake Michigan water to the City of Waukesha, as discussed in the Environmental Report Update, will require the construction of pipelines crossing water bodies and wetlands. All of the preliminary design alternatives analyzed in the study have shown that they will cross a wetland or waterway of some kind (wetland, stream, etc.).

The list below provides examples of the techniques that may be used during construction of the pipeline. These techniques were identified from typical practices used for prior long pipeline construction projects in Wisconsin, including Federal Energy Regulatory Commission pipeline projects, among others. The actual procedures that will be implemented during construction will be agreed upon by the regulatory agencies during the final design of this project and may include some of these techniques as well as others.

1.01 INSTALLATION OF WATERBODY CROSSINGS

A. General Crossing Procedures:

1. Comply with the Corps of Engineers (COE), or its delegated agency, permit terms and conditions.
2. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
3. If the pipeline parallels a waterbody, attempt to maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way.
4. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.
5. Maintain adequate flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.
6. Waterbody buffers (extra work area setbacks, refueling restrictions, etc.) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

B. Spoil Pile Placement and Control:

1. All spoil from minor and intermediate waterbody crossings, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas as described in section V.B.2.

2. Use sediment barriers to prevent the flow of spoil or heavily silt laden water into any waterbody.

C. Equipment Bridges:

1. Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.

2. Construct equipment bridges to maintain unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:

   a. Equipment pads and culvert(s).

   b. Equipment pads or railroad car bridges without culverts.

   c. Clean rock fill and culvert(s); and

   d. Flexi-float or portable bridges.

3. Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.

4. Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.

5. Design and maintain equipment bridges to prevent soil from entering the waterbody.

6. Remove equipment bridges as soon as possible after permanent seeding unless the COE, or its delegated agency, authorizes it as a permanent bridge.

7. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove equipment bridges as soon as possible after final cleanup.

D. Dry-Ditch Crossing Methods:

1. Unless approved otherwise by the appropriate state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries.

2. Dam and Pump:

   a. The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

   b. Implementation of the dam-and-pump crossing method

   c. Must meet the following performance criteria:

      1) Use sufficient pumps, including on-site backup pumps, to maintain downstream flows;

      2) Construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);

      3) Screen pump intakes;

      4) Prevent streambed scour at pump discharge; and

      5) Monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

3. Flume Crossing: The flume crossing method requires implementation of the following steps:

   a. Install flume pipe before any trenching;

   b. Use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in to achieve an effective seal);

   c. Properly align flume pipe(s) to prevent bank erosion and streambed scour;

   d. Do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and;

   e. Remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

4. Horizontal Directional Drill (HDD): To the extent they were not provided as part of the pre-certification process, for each waterbody or wetland that would be crossed using the HDD method, provide a plan that includes:

    a. Site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;

    b. A description of how an inadvertent release of drilling mud would be contained and cleaned up; and

    c. A contingency plan for crossing the waterbody or wetland in the event the directional drill is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

E. Crossings of Minor Waterbodies: Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

1. Except for blasting and other rock breaking measures (if applicable), complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period;

2. Limit use of equipment operating in the waterbody to that needed to construct the crossing; and

3. Equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described.

F. Crossings of Intermediate Waterbodies: Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

1. Complete instream construction activities (not including blasting and other rock breaking measures, if applicable) within 48 hours, unless site specific conditions make completion within 48 hours infeasible;

2. Limit use of equipment operating in the waterbody to that needed to construct the crossing; and

3. All other construction equipment must cross on an equipment bridge as specified.

G. Crossings of Major Waterbodies: Before construction, the project sponsor shall develop a plan for each major water body crossing. This plan should be developed in

consultation with the appropriate state and Federal agencies and should include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues.

1.02 INSTALLATION OF WETLAND CROSSINGS

A. Extra Work Areas and Access Roads:

1. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, unless site constraints require a narrower buffer, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.
2. The project sponsor shall develop a site-specific construction plan for each extra work area with a less than 50-foot setback from wetland boundaries (except where adjacent upland consists of actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50-foot setback.
3. Limit clearing of vegetation between extra work areas and the edge of the wetland to the certificated construction right-of-way.
4. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats). In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.
5. The only access roads, other than the construction right-of-way, that can be used in wetlands, are those existing roads that can be used with no modification and no impact on the wetland.

B. Crossing Procedures:

1. Comply with COE, or its delegated agency, permit terms and conditions.
2. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe or pipe material necessitates a different implementation approach.
3. Use "directional drill" or "floating mat" techniques to place the pipe in the trench where water and other site conditions allow.

4. Minimize the length of time that topsoil is segregated and the trench is open.
5. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.
6. Cut vegetation just above ground level, leaving existing root systems in place, and remove it from the wetland for disposal.
7. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.
8. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated or frozen. Immediately after backfilling is complete, restore the segregated topsoil to its original location.
9. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way.
10. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.
11. Do not cut trees outside of the approved construction work area to obtain timber for riprap or equipment mats.
12. Attempt to use no more than two layers of timber riprap to support equipment on the construction right-of-way.
13. Remove all project-related material used to support equipment on the construction right-of-way upon completion of construction.